REMARKS

It is respectfully requested that the Examiner enter and consider Claims 1, 3 to 6, 10 to 17 and 20 to 24 as set forth in Appendix I of this paper. Relative to the version of claims previously before the Examiner, Claims 2 and 7 to 9 have been canceled, and Claims 1, 12, 13 and 16 have been amended, as indicated in the listing of the claims.

More specifically, applicants have amended Claim 1 to recite the elements of Claims 2 and 7 to 9, and have adjusted the wording of Claim 16 accordingly. Claims 12 and 13 were amended to correct obvious errors, i.e., the reference to an >inlet angle a< was changed to refer to an "inlet angle α" in Claim 12,[2] and the reference to an >outlet angle b< was changed to refer to an "outlet angle β" in Claim 13.[3] The changes which were effected in the claims do not add new matter.

The changes are also not considered to necessitate a new search or substantial examination on the part of the Examiner since the elements of Claims 2 and 7 to 9 have already been fully considered by the Examiner. Also, as will be addressed in more detail in the following, the revised version of the claims which is presented herewith is deemed to place the application in good condition for allowance. Entry of Claims 1, 3 to 6, 10 to 17 and 20 to 24 as set forth in Appendix I of this paper is therefore deemed equitable and respectfully solicited.

The Examiner rejected Claims 1 to 17 and 20 to 24 as presented with applicants' paper of October 10, 2008, taking the position

a) that Claims 1 to 5, 7, 9, 15 to 17 and 20 to 24 were unpatentable under 35 U.S.C. §103(a) in light of the teaching of ***Biglione et al.*** (**US 4,606,873**) when taken in view of the disclosure of ***Zimmermann et al.*** (**US 5,112,875**);

b) that Claim 6 was unpatentable under 35 U.S.C. §103(a) in light of the teaching of ***Biglione et al.*** when taken in view of the disclosures of ***Zimmermann et al.*** and ***Carmody et al.*** (**US 3,673,126**);

c) that Claim 8 was unpatentable under 35 U.S.C. §103(a) in light of the teaching of ***Biglione et al.*** when taken in view of the disclosures of ***Zimmermann et al.*** and of ***Cuff*** (**US 3,981,959**); and

d) that Claims 10 to 14 were unpatentable under 35 U.S.C. §103(a) in light of the teaching of ***Biglione et al.*** when taken in view of the disclosures of ***Zimmermann et al.*** and ***Knaus*** (US

2) Cf. page 5, indicated lines 8 and 9, of the application.

3) Cf. page 5, indicated lines 10 to 11, of the application.

5,605,937).

It is respectfully noted that Claim 1 which is the only independent claim previously pending and presented herewith has been amended to recite, i.e., the elements of previous claim 8. The respective subject matter was not deemed to be unpatentable in accordance with issues (a), (b) and (d) of the most recent Office action, and applicants' amendment, accordingly, obviates those issues.[4] Withdrawal of the respective rejections is therefore respectfully solicited.

It is further respectfully requested that the Examiner favorably reconsider the position that the subject matter of Claim 8, or Claims 1, 3 to 6, 10 to 17 and 20 to 24 has presented herewith, is unpatentable under 35 U.S.C. §103(a) in light of the teaching of ***Biglione et al.*** (US 4,606,873) when taken in view of the disclosures of ***Zimmermann et al.*** (US 5,112,875) and of ***Cuff*** (US 3,981,959).

"*Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.*"[5] While the Supreme Court confirmed that the analysis under 35 U.S.C. §103 "*need not seek out precise teachings directed to the specific subject matter of the challenged claim, for* a court *can take account of the inferences and creative steps that a person of ordinary skill in the art would employ,*"[6] the Supreme Court, however, also cautioned that "rejections on obviousness grounds *cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.*"[7] Notably, the Supreme Court emphasized the need "*to determine whether there was an apparent reason to combine known elements in the fashion claimed by the patent at issue.*"[8] To establish a prima facie case of obviousness it is, therefore, essential that there be some motivation or suggestion to make the claimed invention in light of the

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4) If an independent claim is non-obvious under 35 U.S.C. §103, then any claim depending therefrom is non-obvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

5) *Graham v. John Deere*, 383 U.S. 1, at 17 - 18, 148 USPQ 459 (1966). Cf. *KSR Int'l v. Teleflex, Inc.*, 550 U.S. ___ (2007), Slip op. at 2.

6) *KSR Int'l v. Teleflex Inc.*, 127 S.Ct. 1727, ___, 82 USPQ2d 1385, 1397 (2007); emphasis added.

7) *KSR Int'l v. Teleflex, Inc.*, 127 S.Ct. at ____, 82 USPQ2d at 1396 (quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)); emphasis added.

8) *KSR Int'l v. Teleflex, Inc.*, 550 U.S. ___ (2007), Slip op. at 14.

prior art teachings.[9] "*[A] proper analysis under §103 requires, inter alia, consideration of ... whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process.*"[10] Moreover:[11]

> *It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.*

It is respectfully urged that the teaching of ***Biglione et al.*** taken in view of the disclosures of ***Zimmermann et al.*** and of ***Cuff*** cannot be deemed to render applicants' invention as a whole *prima facie* obvious when the references are properly evaluated for what they fairly suggested to one of ordinary skill in the pertinent technology. Further, once the references are duly evaluated for what they fairly suggested at the time applicants made their invention, the Examiner's reasoning cannot be deemed to have the rational underpinning which is necessary to support a conclusion of obviousness.

The Examiner argued that it would have been obvious to a person of ordinary skill in the pertinent art to employ "*the polystyrene polymer with molecular weight of about 180,000 to about 300,000 g/mol as taught by ZIMMERMANN et al. in the process of preparing expandable polystyrene polymers as taught by BIGLIONE et al. in order to produce polystyrene granules from expandable styrene polymers with high degree of expandability due to the use of low level blowing or foaming agents used to make articles like seat cushions.*"[12]

However, a person of ordinary skill in the pertinent art who contemplated the disclosure of ***Zimmermann et al.*** together with the disclosure of ***Biglione et al.*** would have appreciated that the procedure which is described in the secondary reference yields expandable polystyrene beads, i.e., polystyrene beads which already include appropriate amounts of (*low level foaming or*) blowing agent, and that the polystyrene beads which are obtained in accordance with the procedure of ***Zimmermann et al.*** can be readily expanded and processed to form moldings such as seat cushions.[13]

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9) See, e.g., *In re Brouwer*, 77 F.3d 422, 425, 37 USPQ2d 1663, 1666 (Fed. Cir. 1996) ("[T]he mere possibility that one of the esters or the active methylene group-containing compounds . . . could be modified or replaced such that its use would lead to the specific sulfoalkylated resin recited in claim 8 does not make the process recited in claim 8 obvious "unless the prior art suggested the desirability of [such a] modification" or replacement.") (quoting *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)).

10) *In re Vaeck*, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991).

11) Cf. *In re Wesslau*, 353 F.2d 238, 241, 147 USPQ 391, 393 (CCPA 1965); see also *In re Mercer*, 515 F.2d 1161, 185 USPQ 774, (CCPA 1975); *Bausch & Lomb v. Barnes-Hind/Hydrocurve*, 796 F.2d 443, 230 USPQ 416 (Fed. Cir. 1986).

12) Cf. final Office action page 3, line 18, to page 4, line 2.

13) Cf., e.g., Examples 1 and 2, col. 9, indicated line 32, to col. 10, indicated line 39, of ***US 5,112,875***.

In fact, the procedure which is disclosed by ***Zimmermann et al.*** falls within the realm of art which is addressed by ***Biglione et al.*** in col. 1, indicated lines 29 to 46. ***Biglione et al.*** state in the respective section with regard to the suspension polymerization procedure such as, for example, described by ***Zimmermann et al.***, that the procedure yields expandable beads of good quality which are well suited for the use in important fields such as the building, refrigeration, and packaging fields. Also notably, ***Biglione et al.*** specifically state that the expandable granules which are obtained in accordance with the taught extrusion process "*are, from the point of view of their behavior in the subsequent operations of expansion and shape molding, similar to the well known expandable beads obtained by incorporating the expanding agent during the polymerization process in suspension.*"[14)]

It is deemed to be immediately evident that a person of ordinary skill in the pertinent art had no apparent reason whatsoever to employ the already expandable polystyrene beads which are obtained in accordance with the the suspension polymerization of ***Zimmermann et al.*** in the process of ***Biglione et al.*** Again, the polystyrene beads of ***Zimmermann et al.*** already comprise appropriate amounts of (*low level foaming or*) blowing agent, i.e., are already well suited for the manufacture of moldings such as seat cushions. Also, as confirmed by the statement of ***Biglione et al.***, the respective beads are similar in their behavior in the subsequent utilization. The Examiner's argument that a person of ordinary skill would have employed ***Zimmermann et al.***'s <u>expandable</u> polystyrene beads in the process of ***Biglione et al.*** "*in order to produce polystyrene granules from expandable styrene polymers with high degree of expandability*" is therefore deemed to lack the rational underpinning which is required to support a conclusion of obviousness. For those reasons alone, the Examiner's rejection is deemed to be based on error and should be withdrawn.

Acknowledging that neither the teaching of ***Biglione et al.*** nor the disclosure of ***Zimmermann et al.*** could be deemed to suggest or imply that the die plate be heated to a certain temperature above the temperature of the blowing agent-containing polymer melt as is required in accordance with applicants' claims,[15)] the Examiner asserted that such a measure would have been obvious to one of ordinary skill in light of the disclosure of ***Cuff*** which allegedly "*provides a device and process which the ordinary artisan would have recognized as within the scope of BIGLIONE's suggestion to adjust the temperature to avoid solidification within the extrusion holes.*"[16)]

Cuff describes an apparatus for pelletizing synthetic plastic resins which apparatus *inter alia* comprises an adaptor (52) and a die (38). Illustratively, ***Cuff*** further describes the pelletizing of

14) Cf., col. 3, indicated lines 22 to 27, of ***US 4,606,873***.

15) Final Office action page 7, lines 8 and 9.

16) Final Office action page 7, line 19, to page 8, line 2.

polypropylene and mentions in that context:

> *As the polypropylene emerges from the extruder it is preferably at a temperature of approximately 425°F. (The adaptor 52 will have been heated by the flow of heating oil or other medium at a temperature of 475°–500°F. through suitable manifolds in the adaptor.) After the viscous plastic reaches manifold 58, extrusion is continued until the plastic enters the extrusion bores 82, and passes through the extrusion sleeves 110, and emerges from the die face 154 of the apparatus. The die 38 is maintained in heated condition by the passage of the heating oil through the manifolds 80.*

However, the described apparatus and the mentioned procedure clearly pertain to the pelletizing of thermoplastics which do not comprise any blowing agent. The same holds true where the disclosure of ***Guill*** (US 3,029,466)[17] is concerned which describes the utilization of a liquid phase pelletizer for pelletizing polyethylene resin which is free of blowing agent.[18]

A person of ordinary skill in the pertinent technology readily distinguishes between a *blowing agent-containing* polymer melt which is processed in accordance with the teaching of ***Biglione et al.*** and *blowing agent-free* polymer melts such as processed in accordance with the disclosures of ***Cuff*** and ***Guill.*** It is well known and readily apparent that the conditions which are employed when *blowing agent-free* polymer melts are pelletized are primarily limited by the decomposition temperature of the respective resin. However, in the case of a *blowing agent-containing* polymer melt as is employed in accordance with ***Biglione et al.***'s process, it is of major concern that the extruded polymer granules remain expandable, i.e., that the pellets or granules do not expand prematurely. ***Biglione et al.*** briefly mentions the problematic of undesirable premature expansion of the material, for example, in col. 2, indicated lines 20 to 24 (*emphasis added*):

> *In order to eliminate them [orientations and stresses], on the contrary, it should be necessary to work at a temperature higher than the Tg of the polymer and to cool slowly. This process, however, involves the risk of the non-desired expansion of the material.*

and in col. 3, indicated lines 16 to 20 (*emphasis added*):

> *These conditions are essential both to avoid a beginning expansion of the granules and to reduce to a minimum the formation in said granules of orientation, stresses and/or internal holes caused by quenching.*

The process of ***Biglione et al.*** not only employs temperatures which are higher than the Tg of the polymer, but also involves slowly cooling the polymer melt. More specifically, ***Biglione et al.*** extrude the blowing agent-containing polymer at a temperature which is higher than the Tg of the

17) Final Office action page 10, line 20, to page 11, line 21.

18) E.g., col. 2, indicated lines 52 to 29, of ***US 3,029,466***.

polymer,[19] i.e., under conditions which already bear the distinct risk of undesirable, premature expansion. It is deemed to be immediately evident that a person having ordinary skill in the pertinent art, therefore, would not reasonably be motivated to further increase the risk of undesirable, premature expansion of the granules by heating the die plate to an even higher temperature, e.g., a temperature in the range of from 20 to 100°C above the temperature of the blowing agent-containing polymer melt as is required in accordance with applicants' invention.

While ***Cuff*** and/or ***Guill*** may support that heating a die plate is conventional in the art of pelletizing *blowing agent-free* thermoplastic material, the references are deemed to be unsuited to suggest or imply that the respective technique can be employed successfully in the context of the extrusion of a *blowing agent-containing* polymer melt such as the process of ***Biglione et al.*** The Examiner's position that a person of ordinary skill in the pertinent technology would have been motivated by the disclosure of ***Cuff*** to heat the die plate is, therefore, not deemed to be well taken, and the respective argument is deemed to lack the rational underpinning which is necessary to support a conclusion of obviousness. Again, the Examiner's rejection is deemed to be based on error and should, therefore, be withdrawn.

Moreover, in light of the risks of premature and undesirable expansion of the extruded blowing agent-containing polymer melt which is mentioned by ***Biglione et al.***, a person of ordinary skill in the art would not only have been discouraged from heating the die plate rather than motivated to do so. Such a person would also have expected that heating the die plate would cause the size of the extruded granules to increase due to an onset of the expansion. Contrary to this expectation applicants have found that an increase in the temperature of the die plate reduces the diameter of the extruded granules rather than increasing it. This effect is impressively demonstrated in Example 2, on page 7 of the application.

Accordingly, a blowing agent-containing polymer melt having a temperature of 200°C was extruded at a throughput of 100 kg/h through a die plate having 300 holes of a diameter at the exit of 0.4 mm. When the die plate had the same temperature as the polymer melt, i.e., 200°C, the resulting granules had a diameter of 0.65 mm. An increase of the die plate temperature to 220°C reduced the granule diameter to 0.60 mm, and an increase of the die plate temperature to 240°C further reduced the diameter of the granules to 0.55 mm. In light of the foregoing technical considerations, the results which are obtained in accordance with applicants' process could clearly not be expected.

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19) E.g., col. 3, indicated lines 31 to 35, of ***US 4,606,873***.

It is well settled that the "*invention as a whole*" which is referenced in 35 U.S.C. 103(a) is not limited to the elements which are recited in a claim but also encompasses the properties which are inherent in the claimed combination of those elements:[20)]

> *In determining whether the invention as a whole would have been obvious under 35 U.S.C. 103, we must first delineate the invention as a whole. In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question... but also to those properties of the subject matter which are inherent in the subject matter and are disclosed in the specification... Just as we look to a chemical and its properties when we examine the obviousness of a composition of matter claim, it is this invention as a whole, and not some part of it, which must be obvious under 35 U.S.C. 103.*

The foregoing further supports that the subject matter of applicants' claims in not rendered unpatentable under Section 103(a) by the teaching of ***Biglione et al.*** when taken in view of the disclosures of ***Zimmermann et al.*** and of ***Cuff*** and/or ***Guill.*** It is therefore respectfully urged that the claims are allowable, and that the application is in good condition for allowance. Favorable action is respectfully solicited.

20) *In re Antonie*, 559 F.2d 618, 620, 195 USPQ 6, 8 (CCPA 1977); emphasis original.